

5. Given the end-points $A(2, 1)$ and $B(6, 9)$ of segment AB . The point P divides segment AB in the ratio 3:1 from A .

a) Determine the ratio in which point P divides segment AB from B . 1:3

b) Determine the coordinates of point P in two ways:

1. from A . $x_P = 2 + \frac{3}{4}(4) = 5; y_P = 1 + \frac{3}{4}(8) = 7. P(5, 7)$

2. from B . $x_P = 6 + \frac{1}{4}(-4) = 5; y_P = 9 + \frac{1}{4}(-8) = 7. P(5, 7)$

6. In each of the following cases, determine the coordinates of point P which divides segment AB in the given ratio from A .

a) $A(-3, 1)$ and $B(5, 3)$; ratio 3:1. $P(3, \frac{5}{2})$ b) $A(14, 4)$ and $B(2, 1)$; ratio 1:2. $P(10, 3)$

7. In each of the following cases, find the coordinates of point P if it is located

a) at $\frac{2}{5}$ of the way on segment AB from A , given $A(-1, 2)$ and $B(-16, 2)$; $P(-7, 2)$

b) at $\frac{3}{8}$ of the way on segment AB from B , given $A(-12, -17)$ and $B(-4, -1)$; $P(-9, -11)$

8. Given $A(3, 5)$, $B(1, 3)$ and $C(5, 1)$ the vertices of a triangle ABC .

a) Determine the coordinates of the points M , N and P that are the mid-points of side BC , AC and AB respectively.

$M(3, 2); N(4, 3); P(2, 4)$

b) Draw the medians AM , BN and CP and graphically determine the coordinates of point G , the triangle's centre of gravity. $G(3, 3)$

c) Verify the following property: "The centre of gravity divides each median in the ratio 2:1 from each vertex".

